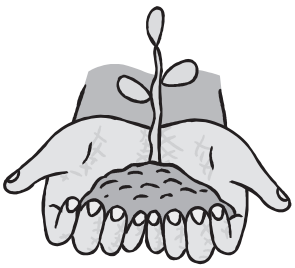
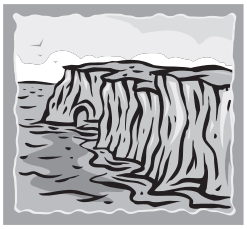
Winter 2011



Muddy Hands

Soil and Water Information for Educators Brought to You by the Lake County Soil and Water Conservation District



Life in the Lake Erie Watershed

Chances are pretty good that you are sitting in the Lake Erie watershed as you read this. You teach a classroom full of students who also live in this watershed, and probably play in its rivers and beaches.

If you grew up in northern Ohio, you have seen improvements in the water quality in Lake Erie. Due in part to several major changes in federal policy, the lake is indeed in better shape than it used to be. There are, however, still major problems that affect the Great Lakes watershed and could change Lake Erie if left unchecked.

One of the problems still degrading water quality in the lake is sediment pollution from land. Eroded soil particles can carry heavy metals, pesticides, plant nutrients (such as nitrogen and phosphorous), and hydrocarbons like oil or asphalt sealers. These chemicals can harm aquatic organisms and upset the balance of the lake's food web. An overloading of nutrients can trigger a harmful algae bloom, which is dangerous to people and animals.

Even if the soil is free from pollutants, it can cause problems for the plants and animals that live in Lake Erie. Excess sediment washing into the lake can smother submerged aquatic beds that exists along marshy shorelines, preventing plants from growing there. Without root structure, these shoreline

Watershed *(Continued on page 4)*

Stream Quality Monitoring For Your Science Curriculum

Did you know Lake SWCD has been operating a stream quality monitoring program called Watershed Watch since 1994? Each September and May, hundreds of students have the opportunity to work in small groups with Lake SWCD staff members and volunteers to conduct field research in Lake County's streams.

Watershed Watch is available to all Lake County public and private schools for classes from 5th grade up through high school. It is an opportunity for your students to participate in a research project, collect meaningful data, and take that data back to the classroom for further projects. They can also access data from previous years and practice their math and chart-making skills to determine trends.

Water quality monitoring can also add real-life experience to lessons on adaptations, body plans, and water chemistry. Students will also learn the importance of following a procedure for data collection, and what kinds of conclusions can be made from the data they collected.

This program is free to all Lake County schools, however, the school needs to provide transportation. Currently, there are several available stations on the lower Grand River in and around Painesville. If you would like to participate in Watershed Watch, please contact Beth to sign up for May 2011.

Inside this Issue:

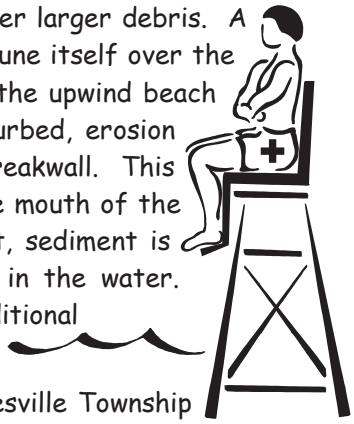
Erosion and Lake Erie

Lake SWCD offers numerous **classroom programs** tailored to the Ohio Standards in science and social studies. Our programs are **free** and can be scheduled anytime from October through April. Check out www.lakecountyohio.gov/soil and click on "Classroom" under the Education menu

Bringing Erosion Indoors

Our Lake Erie coast is a rich source for examples of erosion and deposition in action. Even if you don't have access to a bus and a day to spend on a field trip, you can use photographs, maps, and historical aerials to show your students how our county is constantly being reshaped. Below are some local landscape features you can incorporate into a lesson on erosion.

Headlands Dunes - This little corner of lakefront property shows both windblown and water-driven deposition. The dunes got their start with windblown sand being trapped by plants, sticks, or other larger debris. A dividing fenceline between the dunes and the state park beach has also built a large dune itself over the years. This dune system constantly changes as wind blows exposed particles off of the upwind beach into the dune area. Any place within the dunes where the plant community is disturbed, erosion starts again as well. At the eastern end of the dunes land is forming against the breakwall. This sand is being captured from the longshore current by the breakwall that protects the mouth of the Grand River. Because the general trend of both current and wind is from the west, sediment is pushed from Cleveland towards Ashtabula, unless it is interrupted by a structure in the water. Several acres of land have formed along the breakwall since the mid-1980s. This additional land is subtle, but visible on aerial photographs.



Painesville Township Park - Just downshore of the mouth of the Grand River is Painesville Township Park, and a Painesville Township neighborhood to its east. This area has seen a rapid recession (erosion) of the shoreline. In the second half of the last century, erosion rates averaged about 10 feet per year. A beach and pavilion at the park, as well as numerous homes and at least one roadway have collapsed into the lake since the 1950s. The bluff is made of glacial till and layers of clay and sand, which leaves it weak against wave action at the base and prone to groundwater pressures along the clay boundaries. The Coastal Erosion Area maps predict future loss of dry land here in the next 30 years. The erosion can be easily seen on all three mapping resources listed below.

Flood Damage along Lake Erie tributaries - In July 2006, Lake County experienced a record-breaking flood. Areas along the Grand River and its tributaries were especially hard-hit. Some of that flood damage is still visible on the 2007 aerials on Lake Navigator. At right are two screen captures (from Lake Navigator) of bridges that were destroyed by flooding. The 2006 flood event carried large pieces of rock and concrete downstream hundreds of feet away from sites like these. Soil that was loosened by the flood waters also created a plume extending from the mouth of the Grand River out into Lake Erie. The silt and clay particles likely settled into deeper portions of the lake, but the sand that washed into the lake has probably stayed near the shoreline and reworked itself onto beaches from Fairport Harbor on east towards Presque Isle. For more information about the flood and the meteorology and hydrology behind it, check out the US Geological Survey report at http://pubs.usgs.gov/of/2007/1164/pdf/ofr20071164.pdf

Map resources:

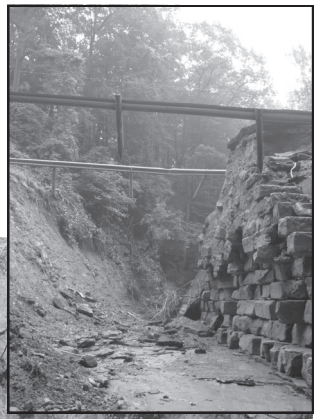
Historic aerials: Lake SWCD has aerials going back to 1937 for most of Lake County. If you want aerials for a specific place, call the office with an address or intersection. To request a set of aerials that demonstrate a specific topic, contact Beth for recommendations. Aerials are free to Lake County residents.

Current aerials: The Lake County GIS department maintains a website, lakegis.org, which allows you to view modern (2007) aerials with current parcel boundaries. Lake Navigator also allows you to add different layers of information to a map, so you can create topo maps, soil type maps, watershed maps, etc. of a specific area.

Coastal Erosion Areas: The CEA maps are also online. These maps use recent coastal erosion rates to predict future erosion potentials. You can find them online at http://www.dnr.state.oh.us/tabid/22349/Default.aspx and see if any part of your community is in a coastal erosion area.

Pictured above is the Doty Road bridge over Mill Creek. The road is the pale, curved line running horizontally through the frame, and the stream is the darker line running from lower left to upper right. There is a house with a barn or detached garage in the upper left. The walls that supported the bridge approach are still visible in the stream channel, but the remains of the bridge have been removed.

Below is Leroy Thompson Rd. north of Painesville Warren Rd. as it crosses Paine Creek. The road is the pale, straight line running from lower left to upper right, and the stream curves from lower right to upper left. The bridge is still standing in this picture, but the approach on the north side has been washed away entirely. The small picture to the right shows the same bridge from the stream level. Note the guard rails hanging over the empty space where the approach used to be. They are barely visible in the aerial as pale lines crossing the gap.



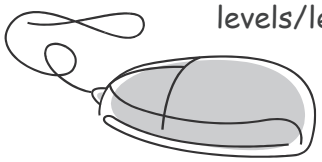
Interesting Lake Erie Links

In Lake Erie, water levels are affected by regional trends in precipitation. The Monthly Water Inventory Report, prepared by the Ohio Department of Natural Resources, will give you information on precipitation trends in the Lake Erie basin and water level information for Lake Erie.

http://www.dnr.state.oh.us/water/waterinv/mwir/tabid/4191/Default.aspx

The Great Lakes Information Network provides links to various gauges that record current and recent lake levels, water and air temps and humidity in near real-time.

http://www.great-lakes.net/envt/water/levels/levels_current.html



Current and recent wind, surface current, water temp, wave height, and other information is provided by the National Oceanographic and Atmospheric Administration, including animation of last 48 hours and near-future predictions.

http://www.glerl.noaa.gov/res/glcfs/

The latest National Weather Service forecasts and maps are available online.

http://www.erh.noaa.gov/er/cle/

Interactive maps are available online from the Geological Survey. You can explore earthquakes, coastal erosion area, oil and gas wells, and mineral operations in Ohio.

http://ohiodnr.com/geosurvey/apps/IMSapps/

Watershed *(Continued from page 1)*

areas are more prone to erosion by wave action and by flooding during periods of higher water levels in the lake. Submerged rooted plants are also important shelter areas for young fish and other prey species.

Sediment can also bury the areas of cobbles (larger rocks) in rivers and clean sand in the lake. These benthic, or bottom-dwelling environments are important habitat to many different animal species, whether they live there for their entire lives, or just during a juvenile period.

The build up of sediment around the mouths of rivers is also an economic issue. As sediment fills in a channel, it decreases the volume of water that can move through the channel. This increases flood risks to low-lying land along the river. Also, every inch of draft (the distance from the surface of the water to the keel of a ship) on a lake freighter represents thousands of pounds of cargo. Since most ports started life as a developed area near the mouth of a river, most harbors on Lake Erie have a river flowing into them. If a harbor is 'silted in' by sediment washing into it, each laker has to reduce the tonnage in the holds, requiring more trips, and burning more diesel fuel.

Current issues are a great tool to draw students into the topic at hand. The Great Lakes are well-studied, and much of the information being gathered is available online. So if you are teaching weather, erosion, biology, physics, or any number of science topics this year, be sure to check out some of the websites listed on page 3.

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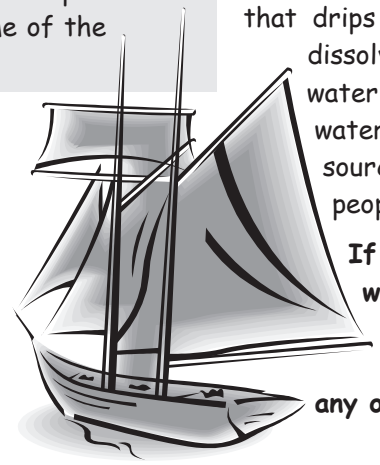

Stormwater Sidebar: We have met the enemy and they are us

"We have met the enemy and they are ours" was the opening to the report to General William Henry Harrison giving the outcome of the Battle of Lake Erie. When Oliver Hazard Perry outmaneuvered the British fleet in the battle, about a third of his crew had dysentery. This unpleasant disease likely spread through the American fleet because they were drinking untreated water from Lake Erie and releasing untreated waste into Lake Erie.

Fast forward about 150 years and the nation's attention is again focused on Lake Erie. In June of 1969, the Cuyahoga River caught on fire (for at least the 12th time) and caught the attention of national media. And while Cleveland's reputation is still marred, the Cuyahoga River fire inspired nationwide changes in the way industry and large cities had to manage discharges to the nation's waters. The Clean Water Act of 1972 set discharge standards for industrial facilities, municipal governments, and some agricultural sources, and the Cuyahoga is coming back to life.

Almost 200 years since the Battle of Lake Erie and almost 50 years since the Clean Water Act was passed, Lake Erie's water quality is still degraded by the actions of those who live on or near it. Research in the 1970s and 1980s has demonstrated just how much of a problem non-point source pollution is. The pollutants that continue to impact Lake Erie today are likely to originate in our neighborhoods, and not along our industrial corridors. In areas of new construction, there are often swales and retention ponds, and other pre-treatment structures to absorb some of the pollution, but in older communities, there is often not the open space to install any stormwater treatment measures. This means that every handful of soil that washes off of a slope, every drop of oil that drips from a car, and every bit of phosphorous that dissolves into storm runoff will find its way into the lake water where we boat, fish, swim, and draw our drinking water. The key to reducing the amount of nonpoint source pollution in Lake Erie is education that inspires people to change their individual actions.

If you would like to schedule a free program on water quality, erosion, nonpoint source pollution, or the environmental history of the Great Lakes for your students, please contact Beth through any of the methods listed to the left.